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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/735,191

12/12/2003

Julia Wan-Ping Hsu

Hsu 4-5

2613

7590

10/14/2004

Docket Administrator (Room 3J-219)

Lucent Technologies Inc.

101 Crawfords Corner Road

Holmdel, NJ 07733-3030

EXAMINER

NGUYEN, JOSEPH H

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 10/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/735,191 ✓

Applicant(s)

HSU ET AL.

Examiner

Joseph Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/12/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

Claim 9 is objected to because of the following informalities: –in contact—should be –in contact with – on line 1. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-7, 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Tadatomo et al.

Regarding claim 1, Tadatomo et al discloses on figure 4 an apparatus comprising a crystalline substrate 1 having a top surface; a crystalline semiconductor layer 3 comprising group III- nitride and being located on the top surface, the crystalline semiconductor layer having first and second surfaces, the first surface being in contact with the top surface, the second surface being separated from the top surface by semiconductor of the crystalline semiconductor layer; and a plurality of dielectric regions 21(col. 5, lines 27-30) located on the second surface, each dielectric region being distant from the other dielectric regions and covering and end of an associated lattice defect, each lattice defect threading the crystalline semiconductor layer.

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Regarding claim 2, Tadatomo et al discloses on figure 4 the crystalline substrate 1 is lattice mismatched to the crystalline semiconductor layer.

Regarding claim 3, Tadatomo et al discloses on figure 4 each dielectric region 21 is a cap covering a single threading defect.

Regarding claim 5, Tadatomo et al discloses the dielectric regions 21 comprise metal oxide (col. 4, lines 27-32).

Note that since layers 21 and 2 are formed in the same manner as taught by Tadatomo et al (col. 5, lines 27-30), layers 21 and 2 should be made of the same material.

Regarding claim 6, Tadatomo et al discloses the group II-nitride comprises Ga (col. 3, lines 33-37).

Regarding claim 7, Tadatomo et al discloses the lattice-mismatched substrate 1 comprises sapphire (col. 3, line 1).

Regarding claim 9, Tadatomo et al discloses on figure 4 a conductor 31 in contact with the second surface and configured to transmit a current to the layer.

Regarding claim 10, Tadatomo et al discloses on figure 4 the lattice defects are electrically passivated.

Regarding claim 11, Tadatomo et al discloses on figure 4 the top surface is planar.

Regarding claim 12, Tadatomo et al discloses the substrate 1 is a c-plane sapphire (col. 4, lines 15-17).

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Regarding claim 13, Tadatomo et al discloses on figure 4 the second surface of the crystalline semiconductor layer is smooth.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tadatomo et al as applied to claim 3 above, and further in view of Camras et al.

Regarding claim 4, Tadatomo et al discloses on figure 4 substantially all the structures set forth in the claimed invention except the caps comprising an oxide of gallium. Note that Tadatomo et al teaches that the cap 21 is made of oxides of Ti, Zr (col. 4, lines 27-31). However, Camras et al teaches that metal oxide of gallium can be alternatively used in place of oxides of Ti, Zr (col. 5, lines 10-14). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tadatomo et al by having the caps comprising an oxide of gallium for the purpose of improving the performance of a semiconductor device.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tadatomo et al as applied to claim 1 above.

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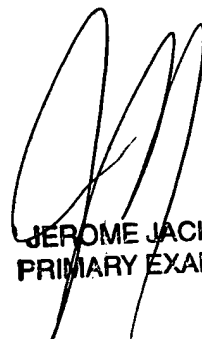
Regarding claim 8, Tadatomo et al discloses on figure 4 substantially all the structures set forth in the claimed invention except a concentration of metal atoms in the lattice defect being higher than in surrounding semiconductor matrix of the crystalline semiconductor layer. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Tadatomo et al by having a concentration of metal atoms in the lattice defect being higher than in surrounding semiconductor matrix of the crystalline semiconductor layer for the purpose of improving the performance of a semiconductor device, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

JN

October 18, 2004.



JEROME JACKSON
PRIMARY EXAMINER